

TITLE OF THE INVENTION
MULTIMEDIA ON-DEMAND SYSTEM, INFORMATION TRANSMISSION
METHOD, AND STORAGE MEDIUM

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FIELD OF THE INVENTION

The present invention relates to a multimedia on-demand system and information transmission method and, more particularly, to a multimedia on-demand
10 system in which a server holds a plurality of pieces of multimedia information, and provides desired multimedia information among them, an information transmission method applied to the multimedia on-demand system, and a storage medium that stores a program for implementing
15 the information transmission method.

BACKGROUND OF THE INVENTION

Conventionally, various multimedia on-demand systems which read out and play back video information
20 recorded in a server have been developed. Such system will be explained below with reference to Figs. 11 and 12.

Fig. 11 is a block diagram showing the arrangement of a conventional video on-demand system.

25 Referring to Fig. 11, reference numeral 401 denotes a video server which stores video data compressed by, e.g., MPEG2. The video server 401 is

connected to a plurality of terminals 403-1 to 403-n
via a multimedia network 402, and sends stored video
information to one of the terminals 403-1 to 403-n via
the multimedia network 402 in accordance with control
5 information sent from that terminal.

The multimedia network 402 transmits control data,
and transmits a plurality of multimedia data such as
video data, audio data, and the like.

The plurality of terminals 403-1 to 403-n have a
10 function of transmitting control data used to designate
and read out a desired video data from a plurality of
video data stored in the video server 401, and a
function of playing back and displaying video data read
out and transmitted from the video server 401.

15 Fig. 12 is a block diagram showing the
arrangement of a conventional video on-demand system
which combines a portable terminal and the Internet.

Referring to Fig. 12, reference numeral 501
denotes a video server which stores video data
20 compressed by a high-compression scheme such as MPEG4
or the like. Reference numeral 502 denotes the
Internet; and 503, a portable telephone terminal which
can establish connection to the Internet 502.

In this conventional system, the user accesses
25 the video server 501 via the Internet 502 using the
portable telephone terminal 503, designates desired

video information, and receives delivery of the designated video information from the video server 501.

However, in the conventional video on-demand system shown in Fig. 11, control data is transmitted by a protocol such as TCP/IP or the like. On the other hand, video and audio data are transmitted by a protocol dedicated to a real-time system other than TCP/IP. Hence, the terminals 403-1 to 403-n must be compatible to both the protocols, and their internal arrangement becomes complicated and expensive.

Also, the multimedia network 402 must be compatible to both the control data of a non-real-time system, and video and audio data of a real-time system, resulting in a complicated, expensive network.

Furthermore, in the conventional video on-demand system shown in Fig. 12, the transmission rate is low (around several ten kbps) since the Internet is used, and the portable telephone terminal 503 can only display video information which is highly compressed by, e.g., MPEG4, since it has a small display screen.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a multimedia on-demand system, information transmission method, and storage medium, which can achieve a simple arrangement and a cost reduction of

each terminal, and can easily handle high-resolution video information.

It is another object of the present invention to provide a video server, terminal, display device,
5 designation confirmation method, and storage medium, which can display video data only on a display terminal correctly designated by the user.

It is another object of the present invention to provide a communication system comprising a plurality
10 of first terminals connected to a first transmission path for transmitting first information; a plurality of second terminals connected to a second transmission path for transmitting second information different from the first information; and a server connected to the
15 first and second transmission paths, wherein the second information is transmitted from the server to one of the plurality of second terminals, and the first information is transmitted from one of the plurality of first terminals to the server to control transmission
20 of the second information from the server.

It is another object of the present invention to provide the system wherein the first information contains first designation information for designating one of a plurality of pieces of information held in the
25 server, and second designation information for designating one of the plurality of second terminals, and the second information is information which is read

out from the server on the basis of the first designation information, and is transmitted from the server to the second terminal designated by the second designation information.

5 It is another object of the present invention to provide an information transmission method applied to a communication system which comprises a plurality of first terminals connected to a first transmission path for transmitting first information, a plurality of
10 second terminals connected to a second transmission path for transmitting second information different from the first information, and a server connected to the first and second transmission paths, comprising the first transmission step of transmitting the first
15 information from one of the plurality of first terminals to the server; and the second transmission step of transmitting the second information from the server to one of the plurality of second terminals on the basis of the first information transmitted in the
20 first transmission step.

 It is another object of the present invention to provide the method wherein the first information contains first designation information for designating one of a plurality of pieces of information held in the
25 server, and second designation information for designating one of the plurality of second terminals, and the second information is information which is read

out from the server on the basis of the first designation information, and is transmitted from the server to the second terminal designated by the second designation information.

5 It is another object of the present invention to provide a computer readable storage medium, which stores as a program an information transmission method applied to a communication system which comprises a plurality of first terminals connected to a first
10 transmission path for transmitting first information, a plurality of second terminals connected to a second transmission path for transmitting second information different from the first information, and a server connected to the first and second transmission paths,
15 the information transmission method comprising the first transmission step of transmitting the first information from one of the plurality of first terminals to the server; and the second transmission step of transmitting the second information from the
20 server to one of the plurality of second terminals on the basis of the first information transmitted in the first transmission step.

 It is another object of the present invention to provide a video server which is connected to a
25 plurality of first terminals via a first transmission path, and to a plurality of second terminals via a second transmission path, comprising display request

reception means for receiving a video information display request which is transmitted from one of the plurality of first terminals, and consists of video designation information for designating video information to be displayed, and display device designation information for designating the second terminal which is to display the video information; confirmation information transmission means for transmitting first confirmation information, which is generated based on the video information display request, to the second terminal designated by the display device designation information of the video information display request; request confirmation information reception means for receiving request confirmation information which is transmitted from one of the plurality of first terminals, and consists of second confirmation information; first comparison means for comparing identification information of the first terminal which transmitted the request confirmation information, and identification information of the first terminal which transmitted the video information display request; second comparison means for comparing the second confirmation information contained in the request confirmation information received by the request confirmation information reception means, and the first confirmation information transmitted by the confirmation information

transmission means; and video information transmission means for transmitting video information designated by the video designation information of the video information display request to the second terminal
5 designated by the display device designation information in accordance with comparison results of the first and second comparison means.

It is another object of the present invention to provide a terminal connected to a video server which
10 transmits, upon receiving a video information display request containing video designation information for designating video information to be displayed, and display device designation information for designating a display device which is to display the video
15 information, first confirmation information generated based on the video information display request to the display device designated by the display device designation information of the video information display request before the video information designated
20 by the video designation information of the video information display request is transmitted to the display device designated by the display device designation information, comprising: generation means for, when a user, who can recognize the first
25 confirmation information as a result of transmitting the first confirmation information to the display device designated by the display device designation

information of the video information request, inputs
second confirmation information which is the same as
the first confirmation information, generating request
confirmation information on the basis of the second
5 confirmation information; and transmission means for
transmitting the request confirmation information
generated by the generation means to the video server.

It is another object of the present invention to
provide a display device connected to a video server
10 which transmits, upon receiving a video information
display request containing video designation
information for designating video information to be
displayed, and display device designation information
for designating a display device which is to display
15 the video information, first confirmation information
generated based on the video information display
request to the display device designated by the display
device designation information of the video information
display request, and transmits, when second
20 confirmation information received later is the same as
the first confirmation information and a terminal which
transmitted the video information display request is
the same as a terminal which transmitted the second
confirmation information, video information designated
25 by the video designation information of the video
information display request to the display device
designated by the display device designation

information, comprising: first display means for displaying the video information; and second display means for displaying the first confirmation information.

It is another object of the present invention to
5 provide a designation confirmation method applied to a video server which is connected to a plurality of first terminals via a first transmission path, and to a plurality of second terminals via a second transmission path, comprising the display request reception step of
10 receiving a video information display request which is transmitted from one of the plurality of first terminals, and consists of video designation information for designating video information to be displayed, and display device designation information
15 for designating the second terminal which is to display the video information; the confirmation information transmission step of transmitting first confirmation information, which is generated based on the video information display request, to the second terminal
20 designated by the display device designation information of the video information display request; the request confirmation information reception step of receiving request confirmation information which is transmitted from one of the plurality of first
25 terminals, and consists of second confirmation information; the first comparison step of comparing identification information of the first terminal which

transmitted the request confirmation information, and
identification information of the first terminal which
transmitted the video information display request; the
second comparison step of comparing the second
5 confirmation information contained in the request
confirmation information received in the request
confirmation information reception step, and the first
confirmation information transmitted in the
confirmation information transmission step; and the
10 video information transmission step of transmitting
video information designated by the video designation
information of the video information display request to
the second terminal designated by the display device
designation information in accordance with comparison
15 results in the first and second comparison steps.

It is another object of the present invention to
provide a computer readable storage medium that stores
as a program a designation confirmation method applied
to a video server which is connected to a plurality of
20 first terminals via a first transmission path, and to a
plurality of second terminals via a second transmission
path, the designation confirmation method comprising
the display request reception step of receiving a video
information display request which is transmitted from
25 one of the plurality of first terminals, and consists
of video designation information for designating video
information to be displayed, and display device

designation information for designating the second terminal which is to display the video information; the confirmation information transmission step of transmitting first confirmation information, which is
5 generated based on the video information display request, to the second terminal designated by the display device designation information of the video information display request; the request confirmation information reception step of receiving request
10 confirmation information which is transmitted from one of the plurality of first terminals, and consists of second confirmation information; the first comparison step of comparing identification information of the first terminal which transmitted the request
15 confirmation information, and identification information of the first terminal which transmitted the video information display request; the second comparison step of comparing the second confirmation information contained in the request confirmation
20 information received in the request confirmation information reception step, and the first confirmation information transmitted in the confirmation information transmission step; and the video information transmission step of transmitting video information
25 designated by the video designation information of the video information display request to the second terminal designated by the display device designation

information in accordance with comparison results in the first and second comparison steps.

Other features and advantages of the present invention will be apparent from the following
5 description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

10 The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together with the descriptions, serve to explain the principle of the invention.

15 Fig. 1 is a block diagram showing the arrangement of a multimedia on-demand system according to the first embodiment of the present invention;

Fig. 2 is a block diagram showing the internal arrangement of a server according to the first
20 embodiment of the present invention;

Fig. 3 is a block diagram showing the internal arrangement of a control terminal according to the first embodiment of the present invention;

Fig. 4 is a block diagram showing the internal
25 arrangement of a display terminal according to the first embodiment of the present invention;

Fig. 5 is a block diagram showing the arrangement of a multimedia on-demand system according to the second embodiment of the present invention;

Fig. 6 is a block diagram showing the arrangement of a multimedia on-demand system according to the third embodiment of the present invention;

Fig. 7 is a block diagram showing the arrangement of a multimedia on-demand system according to the fourth embodiment of the present invention;

Fig. 8 is a flow chart showing the sequence of processes executed by a server according to the fourth embodiment of the present invention;

Fig. 9 is a block diagram showing the arrangement of a multimedia on-demand system according to the fifth embodiment of the present invention;

Fig. 10 is a block diagram showing the arrangement of a confirmation information processor of a server according to the sixth embodiment of the present invention;

Fig. 11 is a block diagram showing the arrangement of a conventional video on-demand system; and

Fig. 12 is a block diagram showing the arrangement of a conventional video on-demand system that combines a portable telephone terminal and the Internet.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will be described hereinafter with reference to the accompanying drawings.

5 (First Embodiment)

Fig. 1 is a block diagram showing the arrangement of a multimedia on-demand system according to the first embodiment of the present invention.

Referring to Fig. 1, reference numeral 1 denotes
10 a server which stores various kinds of video information, and has a function of reading out desired video information in accordance with control information sent from a control terminal (to be described later), and transmitting the readout
15 information to a display terminal (to be described later).

Reference numeral 20 denotes a narrow-band communication path, which is located between a plurality of control terminals 40-1 to 40-n, and the
20 server 1, and serves as a communication path for transmitting control information from each control terminal to the server 1. As the narrow-band communication path 20, a wireless or wired telephone network can be used.

25 Reference numeral 30 denotes a broad-band communication path which serves as a communication path for transmitting video information read out from the

server 1 to a display terminal (to be described later).
As the broad-band communication path 30, a broad-band
wired network such as ATM or the like can be used. To
the broad-band communication path 30, a plurality of
5 display terminals 50-1 to 50-n are connected, PVC
(Permanent Virtual Connection) values are respectively
set between the server 1 and display terminals 50-1 to
50-n, and routing from the server 1 to each of the
display terminals 50-1 to 50-n is done in accordance
10 with address information corresponding to the PVC
values.

Fig. 2 is a block diagram showing the internal
arrangement of the server 1.

The server 1 comprises a narrow-band
15 communication unit 11, protocol processor 12,
controller 13, video information storage 14, address
setting unit 15, and broad-band transmitter 16.

The narrow-band communication unit 11 is
connected to narrow-band communication units (to be
20 described later) of the control terminals 40-1 to 40-n
via the narrow-band communication path 20, and executes
communications with the control terminals 40-1 to 40-n.

The protocol processor 12 executes processes of a
protocol in communications of control information made
25 between the narrow-band communication unit 11 and those
of the control terminals 40-1 to 40-n.

The controller 13 controls, e.g., a read process of video data from the video information storage 14 in accordance with control information sent from the protocol processor 12.

5 The video information storage 14 saves video information compressed based on compression standards such as MPEG2 or the like, and desired video information is read out from the storage 14 under the control of the controller 13.

10 The address setting unit 15 sets a destination address to be appended to video information read out from the video information storage 14 in accordance with an instruction from the controller 13.

15 The broad-band transmitter 16 transmits video information read out from the video information storage 14 via the broad-band communication path 30.

20 Upon receiving control information from one of the control terminals 40-1 to 40-n via the narrow-band communication path 20, the server 1 with the above arrangement reads out video information designated by the control information from various kinds of video information stored in the video information storage 14, appends predetermined address information to the readout information, and transmits the video
25 information from the broad-band transmitter 16 to the display terminal corresponding to the predetermined

address information via the broad-band communication path 30.

The broad-band communication path 30 transmits the video information read out from the video information storage 14 of the server 1 to a corresponding display terminal in accordance with the address information appended by the address setting unit 15.

Fig. 3 is a block diagram showing the internal arrangement of the control terminal 40-1. Since the control terminals 40-1 to 40-n have the same arrangement, the internal arrangement of only the control terminal 40-1 will be explained.

The control terminal 40-1 comprises a protocol processor 41, narrow-band communication unit 42, input/output processor 43, output unit 44, and input unit 45.

The protocol processor 41 processes a protocol in communications of control information made between the narrow-band communication unit 42 and the narrow-band communication unit 11 of the server 1.

The narrow-band communication unit 42 is connected to the narrow-band communication unit 11 of the server 1 via the narrow-band communication path 20, and communicates with the narrow-band communication unit 11.

The input/output processor 43 has an input/output processing function of controlling the output unit 44 and input unit 45, and also a function of outputting information input to the input unit 45 by the user to the protocol processor 41 as control information.

The output unit 44 has a function of displaying information output from the input/output processor 43 to the user. That is, the output unit 44 makes display for prompting the user of the control terminal 40-1 to make operations such as designation of video information to be read out from the video information storage 14 of the server 1.

The input unit 45 is an input device used when the user designates video information to be read out from the video information storage 14 of the server 1.

With this arrangement, the control terminal 40-1 transmits control information for reading out desired video information of those stored in the video information storage 14 of the server 1 to the server 1 via the narrow-band communication path 20.

As the control terminal 40-1, a portable telephone or PHS telephone compatible to a wireless telephone network, a telephone compatible to a wired telephone network, and the like can be used.

Fig. 4 is a block diagram showing the internal arrangement of the display terminal 50-1. Since the display terminals 50-1 to 50-n have the same

arrangement, the internal arrangement of only the display terminal 50-1 will be explained.

The display terminal 50-1 comprises a broad-band receiver 51, display processor 52, and display 53.

5 The broad-band receiver 51 receives video information transmitted from the broad-band transmitter 16 of the server 1 via the broad-band communication path 30.

10 The display processor 52 decodes video information received by the broad-band receiver 51 in a predetermined sequence according to the display function of the display 53, and outputs the decoded information to the display 53.

15 The display 53 displays the video information output from the display processor 52 on a screen.

20 With this arrangement, the display terminal 50-1 displays video information transmitted via the broad-band communication path 30 on the display 53. Note that the display terminal 50-1 need not have any communication function with the server 1.

The operation of the multimedia on-demand system will be explained below with reference to Figs. 1 to 4.

25 Initially, the user of, e.g., the control terminal 40-1 inputs a control signal for a channel establish instruction to the server 1 from the input unit 45. This channel establish control signal is output to the protocol processor 41 via the

input/output processor 43, and a series of control
information are sent from the narrow-band communication
unit 42 to the narrow-band communication unit 11 of the
server 1 in accordance with a predetermined protocol
5 and are processed by the protocol processor 12, thus
establishing a channel.

Subsequently, the user of the control terminal
40-1 inputs from the input unit 45 video designation
information as control information for designating
10 desired video information from various kinds of video
information stored in the server 1, and address
information of a display terminal as control
information for designating a display terminal (e.g.,
display terminal 50-1) that displays the designated
15 video information.

The input video designation information and
address information are transmitted by a predetermined
protocol between the protocol processor 41 of the
control terminal 40-1 and the protocol processor 12 of
20 the server 1, and are sent to the controller 13 of the
server 1.

The controller 13 sets the received address
information in the address setting unit 15. At the
same time, the controller 13 reads out the designated
25 video information from the video information storage 14
on the basis of the video designation information, and
outputs the readout information to the broad-band

transmitter 16. The broad-band transmitter 16 appends the address information output from the address setting unit 15 to the readout video information, and outputs the video information onto the broad-band communication path 30. The broad-band communication path 30 computes a PVC value in accordance with the address information appended to the video information, and executes routing according to the PVC value to transmit the video information to the broad-band receiver 51 of the designated display terminal 50-1.

The video information input to the broad-band receiver 51 is output to the display processor 52, is decoded by the display processor 52, and is displayed on the display 53.

In this manner, in the first embodiment, the narrow-band communication path 20 and broad-band communication path 30 are used together. The server 1 reads out desired video information from various kinds of video information stored in the video information storage 14 in accordance with control information sent from, e.g., the control terminal 40-1 via the narrow-band communication path 20, appends predetermined address information to the video information, and transmits the readout video signal from the broad-band transmitter 16 to the broad-band receiver 51 of, e.g., the display terminal 50-1 corresponding to the predetermined address information

via the broad-band communication path 30. The display terminal 50-1 displays received video information on the display 53.

In this manner, control information is sent from each of the control terminals 40-1 to 40-n which comprise, e.g., portable telephones and the like to the server 1 via the narrow-band communication path 20, while video information is sent from the server 1 to the display terminals 50-1 to 50-n via the broad-band communication path 30. For this reason, the display terminals 50-1 to 50-n and server 1 need not be added with a communication function for transmitting control information via the broad-band communication path 30, thus simplifying the apparatus arrangement.

Furthermore, in the multimedia on-demand system in the first embodiment, existing video distribution networks of an amusement park, various stadiums, and the like can be used as the broad-band communication path 30, the display terminals 50-1 to 50-n are connected to the video distribution network, and users use their portable telephones as the control terminals 40-1 to 40-n. In this case, each user can download and display desired video data on a desired display terminal by operating his or her portable telephone without operating the display terminals 50-1 to 50-n. For this reason, the user need not operate an unfamiliar display terminal, thus improving operability.

Furthermore, for a video service provider, since users do not directly operate display terminals, failures due to operation errors of the display terminals can be prevented.

5 (Second Embodiment)

Fig. 5 is a block diagram showing the arrangement of a multimedia on-demand system according to the second embodiment of the present invention. Since the arrangement of the second embodiment is basically the same as that of the first embodiment, the same reference numerals denote the same parts, and a detailed description thereof will be omitted.

Referring to Fig. 5, reference numeral 100 denotes a server of the second embodiment, which comprises a narrow-band communication unit 11, protocol processor 12, controller 13, video information storage 14, channel designation unit 115, and variable channel transmitter 116.

The channel designation unit 115 sets a channel to be used upon transmitting video information read out from the video information storage 14 in accordance with an instruction from the controller 13.

The variable channel transmitter 116 transmits video information read out from the video information storage 14 to a permanent channel receiver 151 of, e.g., a display terminal 150-1 via the designated channel of

a multichannel communication path 130 (to be described later).

With the above arrangement, the server 100 receives control information from, e.g., a control terminal 40-1 via a narrow-band communication path 20, reads out video information designated by the control information from various kinds of video information stored in the video information storage 14, and transmits the readout video information from the variable channel transmitter 116 to the permanent channel receiver 151 of, e.g., the display terminal 150-1 via a predetermined channel of the multichannel communication path 130.

Reference numeral 130 denotes a multichannel communication path having a plurality of transmission channels. The multichannel communication path 130 has a function of a communication path for transmitting video information read out from the video information storage 14 of the server 100 to the permanent channel receiver 151 of, e.g., the display terminal 150-1 via a channel designated by the channel designation unit 115. As the multichannel communication path 130, a frequency multiplex transmission path of electrical signals, a wavelength multiplex transmission path of optical signals, a time-division multiplex transmission path, a code level multiplex transmission path, and the like can be used.

A plurality of display terminals 150-1 to 150-n are connected to the multichannel communication path 130. Since different channels are set in permanent channel receivers of these display terminals, the display terminals can receive video signals sent from the server 100 without interfering with each other. Video information is transmitted to each display terminal using reception channel information as address information.

Since the plurality of display terminals 150-1 to 150-n have the same arrangement, the arrangement of only the display terminal 150-1 will be explained.

The display terminal 150-1 comprises a permanent channel receiver 151, display processor 52, and display 53. The permanent channel receiver 151 has a function of receiving video information transmitted from the variable channel transmitter 116 of the server 100 via the multichannel communication path 130.

With the above arrangement, the display terminal 150-1 displays video information sent via the multichannel communication path 130 on the display 53.

Note that the display terminals 150-1 to 150-n do not require any communication function with the server 100.

The operation of the multimedia on-demand system in the second embodiment will be explained below with reference to Fig. 5.

Initially, the user of, e.g., the control terminal 40-1 inputs a control signal for a channel establish instruction to the server 100 from an input unit 45. This channel establish control signal is
5 output to a protocol processor 41 via an input/output processor 43, and a series of control information are sent from a narrow-band communication unit 42 to the narrow-band communication unit 11 of the server 100 in accordance with a predetermined protocol and are
10 processed by the protocol processor 12, thus establishing a channel.

Subsequently, the user of the control terminal 40-1 inputs video designation information as control information for designating desired video information
15 from various kinds of video information stored in the server 100, and address information of a display terminal as control information for designating a display terminal (e.g., display terminal 150-1) that displays the designated video information.

20 The input video designation information and address information are transmitted by a predetermined protocol between the protocol processor 41 of the control terminal 40-1 and the protocol processor 12 of the server 100, and are sent to the controller 13 of
25 the server 100.

The controller 13 outputs the received address information to the channel designation unit 115. At

the same time, the controller 13 reads out the designated video information from the video information storage 14 on the basis of the video designation information, and outputs the readout information to the variable channel transmitter 116. The variable channel transmitter 116 sets a transmission channel based on the channel designated by the channel designation unit 115, and outputs the readout video information onto the multichannel communication path 130 via the set transmission channel.

The multichannel communication path 130 transmits the video information using the designated channel to the permanent channel receiver 151 of, e.g., the designated display terminal 150-1.

The video information input to the permanent channel receiver 151 is output to the display processor 52, undergoes a predetermined process by the display processor 52, and is then displayed on the display 53.

As described above, in the second embodiment, the multichannel communication path 130 is used as a broad-band communication path, and the variable channel transmitter 116 of the server 100 specifies a display terminal. Therefore, in the multimedia on-demand system of this embodiment, a CATV communication network can be used as the multimedia communication path 130, conventional CATV terminals can be used as the display

terminals 150-1 to 150-n, and users' telephones and the like can be used as the control terminals 40-1 to 40-n.

In such arrangement, since the multichannel communication path 130 can be a one-way communication path from the server 100 to the display terminals 150-1 to 150-n, a CATV service provider can provide services without adding any new control information communication function to the existing CATV network.

Note that a satellite broadcast network, CS broadcast network, and the like may be used as the multichannel communication path in place of the CATV communication network.

(Third Embodiment)

Fig. 6 is a block diagram showing the arrangement of a multimedia on-demand system according to the third embodiment of the present invention. Since the arrangement of the third embodiment is basically the same as that of the second embodiment, the same reference numerals denote the same parts, and a detailed description thereof will be omitted.

In the third embodiment, a plurality of control terminals 240-1 to 240-n are connected to a narrow-band communication path 20. Since the control terminals 240-1 to 240-n have the same arrangement, the arrangement of only the control terminal 240-1 will be described below.

The control terminal 240-1 comprises a protocol processor 41, narrow-band communication unit 42, input/output processor 43, output unit 44, input unit 45, and proximity communication unit 246.

5 The proximity communication unit 246 has a communication function with a proximity communication unit 254 of a display terminal 250-1 (to be described later).

10 The control terminal 240-1 transmits control information used to read out desired video information from various kinds of video information stored in a video information storage 14 of a server 100 to the server 100 via the narrow-band communication path 20. Furthermore, the control terminal 240-1 communicates
15 with the display terminal 250-1 using the proximity communication unit 246.

In the third embodiment, a plurality of display terminals 250-1 to 250-n are connected to the multichannel communication path 130. Since the display
20 terminals 250-1 to 250-n have the same arrangement, the arrangement of only the display terminal 250-1 will be explained below.

The display terminal 250-1 comprises a permanent channel receiver 151, display processor 52, display 53,
25 proximity communication unit 254, and controller 255.

The proximity communication unit 254 has a communication function with the proximity communication unit of the control terminal 240-1.

5 The controller 255 controls the display terminal 250-1 in accordance with information exchanged between the proximity communication unit 254 of the display terminal 250-1 and the proximity communication unit 246 of the control terminal 240-1.

10 The display terminal 250-1 displays video information transmitted via the multichannel communication path 130 on the display 53. Also, the controller 255 executes the following control processes in accordance with control information sent from the control terminal 240-1.

15 A series of operations of the multimedia on-demand system of the third embodiment will be explained below with reference to Fig. 6 while being classified into the following three items.

20 1) For example, the proximity communication unit 246 of the control terminal 240-1 transmits initial setup control information to, e.g., the display terminal 250-1, and initial setups of the display terminal 250-1 are done based on this control information. The display terminal 250-1 informs the control terminal 240-1 of this initial setup result.

2) The control terminal 240-1 transmits control information to the server 100 via the narrow-band

communication path 20. The server 100 reads out
desired video information from various kinds of video
information stored in the video information storage 14,
appends predetermined address information to that video
5 information, and outputs the video information from the
variable channel transmitter 116 onto a multichannel
communication path 130. The video information is sent
to a permanent channel receiver 151 of, e.g., the
display terminal 250-1 via a channel of the
10 multichannel communication path 130, which is
designated by the predetermined address information.
The display terminal 250-1 displays the received video
information on the display 53. The operation of the
second item is the same as the second embodiment.

15 As in the first embodiment, the server may
comprise an address setting unit 15 and broad-band
transmitter 16, the display terminal may comprise a
broad-band receiver 51, and the broad-band
communication path 130 may be used so as to transmit
20 video information from the broad-band transmitter 16 to
the broad-band receiver 51 via the broad-band
communication path 130.

3) When video information transmitted from the
server 100 begins to be displayed on the display 53 of
25 the display terminal 250-1, the display terminal 250-1
informs the control terminal 240-1 of this. Upon

receiving this message, the control terminal 240-1 disconnects the channel with the server 100.

The operation in item 1 will be explained in detail below.

- 5 The user of, e.g., the control terminal 240-1 inputs a control signal for a video display start preparation instruction to, e.g., the display terminal 250-1 from the input unit 45 before a channel to the server 100 is established.
- 10 The video display start preparation instruction signal is output to the protocol processor 41 via the input/output processor 43, and a series of control information are sent from the proximity communication unit 246 of the control terminal 240-1 to the proximity
- 15 communication unit 254 of the display terminal 250-1 in accordance with a predetermined protocol. The control information sent to the proximity communication unit 254 is output to the controller 255. Upon receiving the control signal, the controller 255 initializes the
- 20 permanent channel receiver 151, display processor 52, display 53, and the like. The permanent channel receiver 151, display processor 52, display 53, and the like execute initialization, and send normal or abnormal execution results to the controller 255. The
- 25 controller 255 transmits the normal/abnormal result information from the proximity communication unit 254

of the display terminal 250-1 to the proximity communication unit 246 of the control terminal 240-1.

In the control terminal 240-1, the normal/abnormal result information received by the proximity communication unit 246 is output to the input processor 43 via the protocol processor 41. The input/output processor 43 sends an output message to the output unit 44 in accordance with the normal/abnormal result information, and the output unit 44 displays that message.

If the output message displayed on the output unit 44 indicates a normal result, the user of the control terminal 240-1 starts a process for reading out video information from the server 100. On the other hand, if the output message from the output unit 44 indicates an abnormal result, the user of the control terminal 240-1 aborts start of the process for reading out video information from the server 100, and makes operation for resetting the abnormal state.

In the first and second embodiments, even when abnormality has occurred in the display terminal, video information is transferred from the server, and the user cannot notice that abnormality until the display terminal starts display. However, in the third embodiment, any abnormality of the display terminal can be found before video information is transferred from the server 100.

The operation in item 3 will be explained in detail below.

Video information, which has been transmitted from the server 100 and input to the permanent channel receiver 151, is output to the display processor 52, which starts a decoding process. When the decoding process has started, the display processor 52 outputs display start information to the controller 255. At the same time, video information is displayed on the display 53. As a method of detecting start of the decoding process, a code delimiting a video signal is detected to determine start of decoding. In an MPEG2 system stream, a sequence header or picture start code can be used as a code delimiting a video signal.

The controller 255 transmits display start information from the proximity communication unit 254 to the proximity communication unit 246 of the control terminal 240-1. In the control terminal 240-1, the proximity communication unit 246 outputs the received display start information to the input/output processor 43 via the protocol processor 41. The input/output processor 43 sends the display start information as a display start message to the output unit 44, which displays that message.

The user of the control terminal 240-1, who watched the display start message displayed on the

output unit 44, disconnects a channel established with the server 100.

As described above, in the third embodiment, since information indicating start of playback of video information is sent from the display terminal to the control terminal, the control terminal can quickly disconnect a channel with the server 100 after the video information begins to be played back.

As another embodiment of the third embodiment, the control terminal 240-1 and display terminal 250-1 may be housed in a single housing, and an internal bus may be used as the proximity communication unit.
(Fourth Embodiment)

Fig. 7 is a block diagram showing the arrangement of a multimedia on-demand system according to the fourth embodiment of the present invention.

Referring to Fig. 7, reference numeral 1 denotes a server which stores various kinds of video information.

Reference numeral 20 denotes a narrow-band communication path, which is located between a plurality of control terminals 40-1 to 40-n, and the server 1, and comprises a wireless or wired telephone network.

Reference numeral 30 denotes a broad-band communication path, which is located between a plurality of display terminals 50-1 to 50-n and the

server 1, and comprises a broad-band wired network such as ATM (Asynchronous Transfer Mode) or the like. In the broad-band communication path 30, PVC (Permanent Virtual Connection) values are respectively set between
5 the server 1 and display terminals 50-1 to 50-n, and routing from the server 1 to each of the display terminals 50-1 to 50-n is done in accordance with address information corresponding to the PVC values.

Since the plurality of control terminals 40-1 to
10 40-n have the same internal arrangement, their internal arrangement will be explained taking that of the control terminal 40-1 as an example. Likewise, since the plurality of display terminals 50-1 to 50-n have the same internal arrangement, their internal
15 arrangement will be explained taking that of the display terminal 50-1 as an example.

The server 1 comprises a narrow-band communication unit 11, protocol processor 12, controller 13, video information storage 14, address
20 setting unit 15, broad-band transmitter 16, transmission confirmation processor 17, identification information reception processor 18, and confirmation information processor 19.

The narrow-band communication unit 11 has a
25 communication function with narrow-band communication units 42 of the control terminals 40-1 to 40-n via a narrow-band communication path 20. The protocol

processor 12 processes a communication protocol upon transmitting a video information display request, request confirmation information, and the like (to be described later) from the narrow-band communication unit 42 to the narrow-band communication unit 11.

The controller 13 executes control upon reading out video information designated by video designation information contained in a video information display request from the video information storage 14 when the narrow-band communication unit 11 receives the video information display request and sends it to the controller 13 via the protocol processor 12. Also, the controller 13 executes control for appending, to the video information, address information of a display terminal to which the video information is to be transmitted to be displayed, and control for appending a destination address to confirmation information (to be described later).

The video information storage 14 saves video information compressed based on compression standards such as MPEG2 or the like, and desired video information is read out from the storage 14 under the control of the controller 13.

The address setting unit 15 has a function of setting a destination address to be appended to video information read out from the video information storage 14 in accordance with an instruction from the

controller 13, and a function of setting a destination address to be appended to confirmation information (to be described later) output from the confirmation information processor 19 in accordance with an instruction from the controller 13.

The broad-band transmitter 16 has a function of transmitting video information read out from the video information storage 14, and confirmation information output from the confirmation information processor 19 to broad-band receivers 51 of the display terminals 50-1 to 50-n via the broad-band communication path 30.

As will be described in detail later, the transmission confirmation processor 17 collates identification information and confirmation information upon receiving request confirmation information after a video information display request from each of the control terminals 40-1 to 40-n, thereby confirming if the user of the control terminal has designated a correct display terminal. If it is confirmed that the user has designated a correct display terminal, the processor 17 instructs the controller 13 to transmit video information.

The identification information reception processor 18 extracts identification information indicating a source control terminal from a video information display request or request confirmation information sent from the control terminals 40-1 to

40-n, and outputs the identification information to the transmission confirmation processor 17.

The confirmation information processor 19 extracts address information contained in a video information display request sent from each of the control terminals 40-1 to 40-n, generates confirmation information, and sends it to the address setting unit 15, as will be described in detail later. Upon receiving request confirmation information from each of the control terminals 40-1 to 40-n, the processor 19 extracts contained in that information, and outputs it to the transmission confirmation processor 17.

Note that the video information display request contains designation information of video information that the user of the control terminal who submitted the video information display request wants to display, address information for designating a display terminal which is to display the video information, and identification information of the control terminal that transmitted the video information display request.

The confirmation information is comprised of a location where the display terminal corresponding to address information is equipped, and a reception time of the video information display request, and is expressed by, e.g., "location A, time B".

The request confirmation information is sent to the server 1 when the user of the control terminal who

watched the confirmation information displayed on the display terminal inputs that confirmation information to the control terminal. The request confirmation information contains the input confirmation information,
5 and identification of the control terminal.

With the above arrangement, upon receiving a video information display request from each of the control terminals 40-1 to 40-n via the narrow-band communication path 20, the server 1 appends address
10 information contained in the video information display request to confirmation information output from the confirmation information processor 19, and transmits that information from the broad-band transmitter 16 to the broad-band receiver 51 of the display terminal
15 corresponding to the address information via the broad-band communication path 30.

Furthermore, upon receiving request confirmation information from each of the control terminals 40-1 to 40-n via the narrow-band communication path 20, the
20 server 1 confirms if the user of the control terminal has designated a correct display terminal as an output destination of video information. If it is confirmed that the user has designated a correct display terminal, the server 1 instructs the controller 13 to transmit
25 video information. The controller 13 reads out designated video information from various kinds of video information stored in the video information

storage 14, appends designated address information to the video information, and transmits the video information from the broad-band transmitter 16 to the broad-band receiver 51 of the display terminal
5 corresponding to the designated address information via the broad-band communication path 30.

The narrow-band communication path 20 has a function as a transmission path for transmitting a video information display request and request
10 confirmation information from the control terminals 40-1 to 40-n to the server 1.

The broad-band communication path 30 has a function as a transmission path for transmitting video information read out from the video information storage
15 14 of the server 1 to the broad-band receiver 51 of the display terminal corresponding to the address information appended by the address setting unit 15.
Also, the path 30 has a function as a transmission path for transmitting confirmation information output from
20 the confirmation information processor 19 to the broad-band receiver 51 of the display terminal corresponding to the address information appended by the address setting unit 15.

When a broad-band wired network such as ATM or
25 the like is used as the broad-band communication path 30, it can serve as both a large-communication capacity communication means for transmitting video information,

and a small-communication capacity communication means
for transmitting confirmation information.

Each of the control terminals 40-1 to 40-n
comprises a protocol processor 41, narrow-band
5 communication unit 42, input/output processor 43,
output unit 44, input unit 45, identification
information transmission processor 46, and confirmation
information input processor 47.

The protocol processor 41 processes a
10 communication protocol upon transmitting a video
information request and request confirmation
information from the narrow-band communication unit 42
to the narrow-band communication unit 11.

The narrow-band communication unit 42 has a
15 processing function of communications made with the
narrow-band communication unit 11 of the server 1 via
the narrow-band communication path 20.

The input/output processor 43 has an input/output
processing function of controlling the output unit 44
20 for displaying information for the user, and the input
unit 45 for accepting information input by the user.
Also, the processor 43 has a function of outputting
information input by the user to the protocol processor
41 as a video information request and request
25 confirmation information.

The output unit 44 has a function of displaying information to be displayed for the user in accordance with processing of the input/output processor 43.

5 The input unit 45 has a function of allowing the user to input a video information display request and request confirmation information.

10 The identification information transmission processor 46 outputs unique identification information assigned to the self control terminal to the protocol processor 41 upon transmitting a video information display request and request confirmation information.

15 The confirmation information input processor 47 outputs confirmation information (request confirmation information) input by the user via the input unit 45 to the protocol processor 41.

20 With the above arrangement, each of the control terminals 40-1 to 40-n transmits a video information display request used to read out desired video information from various kinds of video information stored in the video information storage 14 of the server 1 to the server 1 via the narrow-band communication path 20, and also request confirmation information to the server 1 via the narrow-band communication path 20.

25 The control terminals 40-1 to 40-n comprise portable telephones or PHS telephones compatible to a

wireless telephone network, telephones compatible to a wired telephone network, and the like.

Each of the display terminals 50-1 to 50-n comprises a broad-band receiver 51, display processor 52, display 53, and confirmation information display processor 54.

The broad-band receiver 51 has a function of receiving video information and confirmation information sent from the broad-band transmitter 16 of the server 1 via the broad-band communication path 30.

The display processor 52 decodes video information received by the broad-band receiver 51 by a predetermined sequence according to the display function of the display 53, and outputs the decoded information to the display 53.

The confirmation information display processor 54 outputs confirmation information received by the broad-band receiver 51 to the display 53.

The display 53 has a function of displaying video information output from the display processor 52 and confirmation information output from the confirmation information display processor 54.

With the above arrangement, each of the display terminals 50-1 to 50-n displays video information and confirmation information transmitted from the server 1 via the broad-band communication path 30, thus allowing the user to browse them.

The operation of the multimedia on-demand system with the arrangement shown in Fig. 7 will be described below with reference to Fig. 8.

Fig. 8 is a flow chart showing the sequence of
5 processes executed by the server 1.

Initially, the user of, e.g., the control terminal 40-1 inputs a control signal for instructing to establish a channel between the control terminal 40-1 and server 1 to the server 1 from the input unit
10 45. This channel establish control signal is output to the protocol processor 41 via the input/output processor 43, and is sent from the narrow-band communication unit 42 to the narrow-band communication unit 11 of the server 1 in accordance with a
15 predetermined protocol. The narrow-band communication unit 11 sends the received channel establish control signal to the protocol processor 12, which processes the control signal, thus establishing a channel (S1).

After the channel between the control terminal
20 40-1 and server 1 is established, the user of the control terminal 40-1 inputs, from the input unit 45, video designation information for designating desired video information from various kinds of video information stored in the server 1, and address
25 information for designating a display terminal that displays the designated video information. On the other hand, the identification information transmission

processor 46 outputs the identification information of the self control terminal to the protocol processor 41. The protocol processor 41 transmits a video information display request, which is made up of the video designation information and address information input from the input unit 45, and the identification information output from the identification information transmission processor 46, to the server 1 using a predetermined communication protocol.

10 In the server 1, the protocol processor 12 receives the video information display request, and sends it to the identification information reception processor 18, confirmation information processor 19, and controller 13 (S2). The identification information
15 reception processor 18 extracts the identification information from the video information display request, and outputs the identification information to the transmission confirmation processor 17. The controller
20 13 extracts the address information from the video information display request, and outputs the address information to the address setting unit 15.

 The confirmation information processor 19 extracts the address information from the video information display request, detects the location of
25 the designated display terminal as an output destination of the video information, and generates confirmation information (e.g., "location A, time B")

by combining that location (e.g., location A) and the reception time (e.g., time B) of the video information display request (S3). The processor 19 then outputs this confirmation information to the address setting
5 unit 15 via the controller 13.

The address setting unit 15 appends the address information already sent from the controller 13 to the confirmation information output from the confirmation information processor 19, and outputs the confirmation
10 information to the broad-band transmitter 16. The broad-band transmitter 16 outputs the confirmation information appended with the address information onto the broad-band communication path 30. The broad-band communication path 30 computes a PVC value according to
15 the address information appended to the confirmation information, and executes routing according to the PVC value, thus transmitting the confirmation information to the broad-band receiver 51 of the display terminal designated by the address information (S4).

20 The confirmation information sent to the broad-band receiver 51 is output to the confirmation information display processor 54, which executes a display process, thereby displaying the confirmation information on the display 53.

25 For example, assume that the display terminal designated by the address information is the display terminal 50-1, the confirmation information (e.g.,

"location A, time B") is displayed on the display 53 of the display terminal 50-1, and the user of the control terminal 40-1 can view the display 53 of the display terminal 50-1 at this location A. At this time, the user of the control terminal 40-1 who confirmed this confirmation information inputs a character string "location A, time B" of the confirmation information to the control terminal 40-1 via the input unit 45.

In the control terminal 40-1, the confirmation information input processor 47 outputs the confirmation information of this character string to the protocol processor 41 as request confirmation information. At the same time, the identification information transmission processor 46 outputs the identification information of the self control terminal to the protocol processor 41. The protocol processor 41 transmits request confirmation information which consists of the confirmation information of the input character string "location A, time B", and the identification information from the narrow-band communication unit 42 to the narrow-band communication unit 11 of the server 1 via the narrow-band communication path 20.

If the server 1 receives this request confirmation information (YES in S5), the protocol processor 12 sends this request confirmation information to the identification information reception

processor 18 and confirmation information processor 19.
The identification information reception processor 18
extracts the identification information from the
request confirmation information, and outputs it to the
5 transmission confirmation processor 17. The
confirmation information processor 19 extracts the
confirmation information from the request confirmation
information, and outputs it to the transmission
confirmation processor 17 (S6).

10 The transmission confirmation processor 17
compares the confirmation information (character string
"location A, time B") transmitted to the display
terminal on the basis of the received video information
display request, and that contained in the request
15 confirmation information sent from the control terminal
as a result of displaying that confirmation information
on the display terminal. Also, the processor 17
compares the identification information of the control
terminal which transmitted the video information
20 display request, and that of the control terminal when
the request confirmation information was sent from the
control terminal as a result of displaying the
confirmation information transmitted to the display
terminal based on the video information display request
25 on the display terminal (S7).

If these two pairs of information match, the
processor 17 instructs the controller 13 to transmit a

video signal designated by the video designation information.

The controller 13 reads out designated video information from the video information storage 14 on the basis of the video designation information, and outputs it to the broad-band transmitter 16. The broad-band transmitter 16 appends address information, which is output from the address setting unit 15 and corresponds to the display terminal 50-1, to the readout video information, and outputs the video information onto the broad-band communication path 30 (S8).

The broad-band communication path 30 computes a PVC value in accordance with the address information appended to the video information, and executes routing according to the PVC value, thereby transmitting the video information to the broad-band receiver 51 of the designated display terminal 50-1.

The video information input to the broad-band receiver 51 is output to the display processor 52, which executes a decoding process, thus displaying the video information on the display 53.

If it is determined in step S7 that at least one of two pairs of confirmation information and identification information do not match, the process in step S8 is skipped.

As described above, according to this embodiment,
before designated video information is read out from
various kinds of video information stored in the video
information storage 14 of the server 1 and is
5 transmitted to the display terminal, confirmation
information is output to the display terminal. The
user of the control terminal, who watched this
confirmation information displayed on the display
terminal, returns the confirmation information from the
10 control terminal, and the server 1 that received the
returned confirmation information can confirm that the
user of the control terminal has correctly designated
the display terminal. After that, designated video
information is read out, and is transmitted to the
15 display terminal. Therefore, when the user of the
control terminal designates a wrong display terminal,
video information can be prevented from being
transmitted to that wrong display terminal.

In this embodiment, a broad-band wired network
20 such as ATM or the like, which allows multiplex
transmission is used as the broad-band communication
path 30, which serves as both communication means for
video information, and that for transmitting
confirmation information. Alternatively, communication
25 means for video information, and that for transmitting
confirmation information may be independently arranged.
In this case, a CATV network can be used as

communication means for video information, and a wireless or wired telephone network can be used as that for transmitting confirmation information.

In this embodiment, the video information and
5 confirmation information are output to a single display of the display terminal. Alternatively, the video information and confirmation information may be output to independent displays. In the display terminal, a reception processor, display processor, and display for
10 confirmation information may be provided as an apparatus in a housing independent from that for video information, and the display for video information, and that for confirmation information in the independent housing may be set at separate positions where the user
15 can visually confirm them from an identical position.
(Fifth Embodiment)

Fig. 9 is a block diagram showing the arrangement of a multimedia on-demand system according to the fifth embodiment of the present invention. Since the
20 arrangement of the fifth embodiment is basically the same as that of the fourth embodiment, the same reference numerals denote the same parts, and a detailed description thereof will be omitted.

In the fifth embodiment, a reception number is
25 assigned to video information to be displayed to store given information in correspondence with that number,

and the reception number is used as confirmation information.

Referring to Fig. 9, reference numeral 114 denotes a confirmation information storage for storing
5 text information "your reception number is ***. Please input reception number" or the like in correspondence with the reception number. Also, the storage 114 stores a reception number and identification
10 information of a control terminal that has issued a display request of video information assigned that reception number in correspondence with each other.

Reference numeral 119 denotes a confirmation information processor, which reads out text information corresponding to the reception number assigned to video
15 information designated by a video information display request with reference to the confirmation information storage 114 and outputs the readout information to an address setting unit 15 upon receiving the display request. Also, the processor 119 stores the
20 identification number of the control terminal that has transmitted the video information display request in the confirmation information storage 114 in correspondence with the reception number.

In display terminals 50-1 to 50-n, the
25 confirmation information display processor 54 in the fourth embodiment is omitted.

In the fifth embodiment as well, the video information display request sent from each of the control terminals 40-1 to 40-n to the server 1 contains designation information of video information that the user of the control terminal who submitted the video information display request wants to display, address information for designating a display terminal which is to display the video information, and identification information of the control terminal that transmitted the video information display request.

In the server 1 that has received the video information display request, the confirmation information processor 119 reads out text information (e.g., "your reception number is ***. Please input reception number") corresponding to the reception number assigned to video information with reference to the confirmation information storage 114, and outputs the readout information to the address setting unit 15. Also, the processor 119 stores identification information extracted from the video information display request by an identification information reception processor 18 in the confirmation information storage 114 in correspondence with the reception number assigned to the video information.

The address setting unit 15 appends address information for designating a display terminal which is to display the text information to that text

information read out from the confirmation information storage 114, and the text information is transmitted from a broad-band transmitter 16 to a broad-band receiver 51 of the display terminal corresponding to the address information via a broad-band communication path 30. The text information undergoes a display process by a display processor 52, and is then displayed on a display 53.

Note that the broad-band transmitter 16 outputs this text information onto the broad-band communication path 30 in the form of a video signal. In this way, in the fifth embodiment, neither a dedicated communication means for transmitting confirmation information (text information) nor a dedicated display means in a display terminal for displaying confirmation information (text information) are required in addition to the communication means for transmitting video information.

For example, assume that the display terminal designated by the address information is the display terminal 50-1, confirmation information, i.e., text information (e.g., "your reception number is ***. Please input reception number") is displayed on the display 53 of the display terminal 50-1, and the user of the control terminal 40-1 can view the display 53 of the display terminal 50-1. At this time, the user of the control terminal 40-1 who confirmed this confirmation information inputs the reception number

*** of the confirmation information to the control terminal 40-1 via an input unit 45.

After that, in the control terminal 40-1, a confirmation information input processor 47 outputs this reception number to a protocol processor 41 as request confirmation information. At the same time, an identification information transmission processor 46 outputs the identification information of the self control terminal to the protocol processor 41. The protocol processor 41 transmits request confirmation information, which is made up of the input reception number and identification information, using a predetermined communication protocol from a narrow-band communication unit 42 to the narrow-band communication unit 11 of the server 1 via the narrow-band communication path 20.

When the server 1 receives this request confirmation information, a protocol processor 12 sends this request confirmation information to the identification information reception processor 18 and confirmation information processor 119. The identification information reception processor 18 extracts the identification information from the request confirmation information and outputs it to a transmission confirmation processor 17. The confirmation information processor 119 extracts the reception number from the request confirmation

information and outputs it to the transmission confirmation processor 17.

The transmission confirmation processor 17 compares the reception number "****" in the text information transmitted to the display terminal on the basis of the received video information display request, and that contained in the request confirmation information sent from the control terminal as a result of displaying that text information on the display terminal. Also, the processor 17 compares the identification information of the control terminal which transmitted the video information display request, and that of the control terminal when the request confirmation information was sent from the control terminal as a result of displaying the confirmation information transmitted to the display terminal based on the video information display request on the display terminal.

If these two pairs of information match, the processor 17 instructs the controller 13 to transmit a video signal designated by the video designation information.

The controller 13 reads out designated video information from the video information storage 14 on the basis of the video designation information, and outputs it to the broad-band transmitter 16. The broad-band transmitter 16 appends address information,

which is output from the address setting unit 15 and corresponds to the display terminal 50-1, to the readout video information, and outputs the video information onto the broad-band communication path 30.

5 In this manner, in the fifth embodiment, since the text information is output onto the broad-band communication path 30 in the form of a video signal, neither a dedicated communication means for transmitting confirmation information (text
10 information) nor a dedicated display means in a display terminal for displaying confirmation information (text information) are required in addition to the communication means for transmitting video information.
(Sixth Embodiment)

15 The sixth embodiment will be described below.

 Since the arrangement of the sixth embodiment is basically the same as that of the fourth embodiment, the arrangement of the fourth embodiment will be quoted in the description of the sixth embodiment, and only
20 different arrangement portions will be explained.

 Fig. 10 is a block diagram showing the arrangement of a confirmation information processor of a server in the sixth embodiment.

 Referring to Fig. 10, reference numeral 219
25 denotes a confirmation information processor which corresponds to the confirmation information processor

19 of the fourth embodiment, and includes a random number generator 301.

The confirmation information processor 219 generates confirmation information similar to that in the fourth embodiment. In the fourth embodiment, confirmation information uses information that pertains to the location and time. However, in the sixth embodiment, a random number generated by the random number generator 301 is used as confirmation information. The operation of the sixth embodiment is substantially the same as that of the fourth embodiment, except for the above operation.

Compared to the fourth embodiment which uses information that pertains to the location and time as confirmation information, in the sixth embodiment which uses a random number as confirmation information, it is impossible to estimate confirmation information. Therefore, it is difficult for the user of the control terminal, who is not at a position where he or she can visually observe the display terminal, to estimate confirmation information and to send request confirmation information to the server. Therefore, the server can be prevented from wastefully transmitting video information to a display terminal which is not located within the visible range of the user.

(Another Embodiment)

Note that the objects of the present invention are also achieved by supplying a storage medium, which stores a program code of a software program that can implement the functions of the above-mentioned
5 embodiments to a system or apparatus, and reading out and executing the program code stored in the storage medium by a computer (or a CPU or MPU) of the system or apparatus.

In this case, the program code itself read out
10 from the storage medium implements the functions of the above-mentioned embodiments, and the storage medium which stores the program code constitutes the present invention.

As the storage medium for supplying the program
15 code, for example, a floppy disk, hard disk, optical disk, magnetooptical disk, CD-ROM, CD-R, magnetic tape, nonvolatile memory card, ROM, and the like may be used.

The scope of the present invention includes a case wherein the functions of the above-mentioned
20 embodiments are implemented not only by executing the readout program code by the computer but also by some or all of actual processing operations executed by an OS (operating system) running on the computer on the basis of an instruction of the program code.

25 Furthermore, the scope of the present invention includes a case wherein the functions of the above-mentioned embodiments are implemented by some or

all of actual processing operations executed by a CPU
or the like arranged in a function extension board or a
function extension unit, which is inserted in or
connected to the computer, after the program code read
5 out from the storage medium is written in a memory of
the extension board or unit.

As described in detail above, according to the
embodiments of the present invention, since a control
terminal for transmitting control information, and a
10 display terminal for receiving and displaying video
information are separated, and a network for
transmitting control information and a network for
transmitting video information are separated, the
arrangement of each terminal can be simplified, thus
15 achieving a cost reduction. Also, MPEG2-class,
high-resolution video information can be processed.

A server which received a display request of
video information from the control terminal transmits
confirmation information to a designated display
20 terminal which is to display video information, and
when the user who watched the confirmation information
transmits the same information as the confirmation
information from the control terminal from which he or
she transmitted the video information display required,
25 the video information designated by the display request
is transmitted to the designated display terminal. In
this way, the video information can be displayed only

on the display terminal correctly designated by the user.

Furthermore, the confirmation information is a reception identification number assigned to video information designated by the video designation information, and the reception identification number has a format of a video information. In this fashion, neither a dedicated communication means for transmitting confirmation information (reception identification number) nor a dedicated display means in a display terminal for displaying confirmation information are required in addition to the communication means for transmitting video information.

Moreover, the confirmation information is a random number generated upon receiving the video information display request. In this manner, the user of the control terminal, who is not at a position where he or she can visually observe the display terminal, cannot estimate confirmation information and cannot transmit request confirmation information to the server. Hence, the server can be prevented from wastefully transmitting video information to a display terminal which is not located within the visible range of the user.

The present invention is not limited to the above embodiments and various changes and modifications can be made within the spirit and scope of the present

invention. Therefore, to apprise the public of the scope of the present invention, the following claims are made.

1. A method of determining the presence of a substance in a sample, comprising the steps of: (a) providing a sample; (b) providing a reagent; (c) reacting the sample with the reagent; (d) measuring the reaction product; and (e) comparing the reaction product to a reference value.